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| APPLICATION NO | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|----------------|-------------|----------------------|---------------------|------------------|
| 10/036,898 | 01/04/2002 | Shao-Yen Ku | TS01-380 | 5181 |

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[REDACTED] EXAMINER

TRAN, BINH X

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 1765 | 3 |

DATE MAILED: 05/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-------------------------|------------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/036,898 | KU, SHAO-YEN |
| | Examiner Binh X Tran | Art Unit 1765 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b)

Status

- 1) Responsive to communication(s) filed on 04 January 2002.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-41 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. _____ | 6) <input type="checkbox"/> Other _____ |

DETAILED ACTION

Claim Objections

1. Claims 1, 16, 29 are objected to because of the following informalities:

In line 5 of claims 1 and 16, the phrase “from over” (emphasis added) appears to be a typo error for “form over”.

In line 8 of claim 16 and 29, the phrase “from over” (emphasis added) appears to be a typo error for “form over”.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 11, 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al. (S 6,551,913).

Kim discloses a method for removing polysilicon comprising the steps of: providing a structure having a non-silicon layer (11) formed therein; forming a first polysilicon (12) upon the non-silicon layer (11) (Fig 1);

removing the first polysilicon layer form over the non-silicon layer to expose the non-silicon layer using NH₄OH and deionized water (DIW) in the ratio of 1:2 to 1:50 (within applicant's range, col. 2 line 61 to col. 3 line 15).

Kim further discloses the non-silicon is substantially unaffected by the NH₄OH:DIW dip solution (Fig 1C). Respect to claim 11, Kim discloses the non-silicon layer is a gate oxide (aka silicon oxide). Respect to claim 15, Kim discloses the dip solution is visually observable (Fig 1C).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view Bassous et al. (US 4,113,551).

Kim discloses the selectivity between and temperature of the wet etching process is result effective variables (col. 3 lines 1-18). Claims 2-7 differ from Kim by the specific value of temperature, selectivity and polysilicon etch rate. In a method for etching polysilicon, Bassous discloses that temperature and etch rate are result effective variables with the temperature varies from 20-64 °C and etch rate varies from 20-10000 angstrom/min (within applicants' range, Fig 1-2). Bassous further discloses the selectivity of polysilicon to silicon oxide as well as concentration are result effective variables (col. 4 lines 15-25, Fig 1-2). The result effective variables are commonly

determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal values as an expected result.

5. Claims 8-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Chien et al. (US 5,328,867).

Respect to claim 8, Kim fails to disclose the step of forming a second polysilicon over the exposed non-silicon. Chien discloses the step of forming the second polysilicon (22) over the exposed non-silicon. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kim in view of Chien by forming a second polysilicon because it will protect the exposed non-silicon layer.

Respect to claim 9, Kim does not disclose the step of removing the native oxide before the removal of the first polysilicon layer. However, Kim discloses the step of removing the photoresist mask before wet etching the first polysilicon. Chien also discloses that the native oxide layer is formed due to the photoresist removal. Chien further discloses that the native oxide is removed by using HF dip (col. 3 lines 21-33). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kim in view of Chien by removing the native oxide because it will help to expose the underneath layer.

Respect to claim 10, Chien discloses rinsing the first polysilicon layer (16) with DIW immediately after the removal of native oxide. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kim in view of Chien by

rinsing the polysilicon with DIW after native oxide because it help to remove any HF acid left on the surface.

Respect to claim 12-14, Chien discloses the thickness of the first polysilicon layer ranges from 700-900 angstrom (within applicants' range, col. 3 lines 14-16).

6. Claims 16-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim and Bassous in view of Chien.

Claim 16 differs from Kim and Bassous by further discloses the step of removing native oxide with HF, rinsing it with DIW and the step of forming a second polysilicon layer. Chien discloses rinsing the first polysilicon layer (16) with DIW immediately after the removal of native oxide. It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kim in view of Chien by rinsing the polysilicon with DIW after native oxide because it help to remove any HF acid left on the surface. The limitation of forming the second polysilicon layer has been discussed above.

The limitations of claims 17-21 have been discussed above. Respect to claims 22, Chien discloses the step of rinsing the exposed silicon oxide (14) with DIW and drying the exposed silicon oxide (14) before formation of the second polysilicon layer (22). It would have been obvious to one having ordinary skill in the art, at the time of invention, to modify Kim in view of Chien by rinsing and drying before forming the second polysilicon layer because it will remove any residues left on the surface.

Claims 23-24 differ from the cited prior arts by the specific value of concentration and processing time. Concentration and process time are result effective variables. The result effective variable is commonly determined by routine experiment. The

Art Unit: 1765

process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiments to obtain optimal concentration and processing time as an expected result.

Claims 25-27 differ from the cited prior arts by the specific thickness value of silicon oxide layer. However, Chien and Bassous disclose that the specific thickness is result effective variable by adjusting the values. The result effective variable is commonly determined by routine experiment. The process of conducting routine experiments so as to produce an expected result is obvious to one of ordinary skill in the art. Hence, it would have been obvious to one having ordinary skill in the art, at the time of invention, to perform routine experiment to obtain optimal thickness as an expected result. The limitations of claims 28-41 have been discussed above.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Binh X Tran whose telephone number is (703) 308-1867. The examiner can normally be reached on Monday-Thursday and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Art Unit: 1765

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Binh X. Tran
May 2, 2003

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